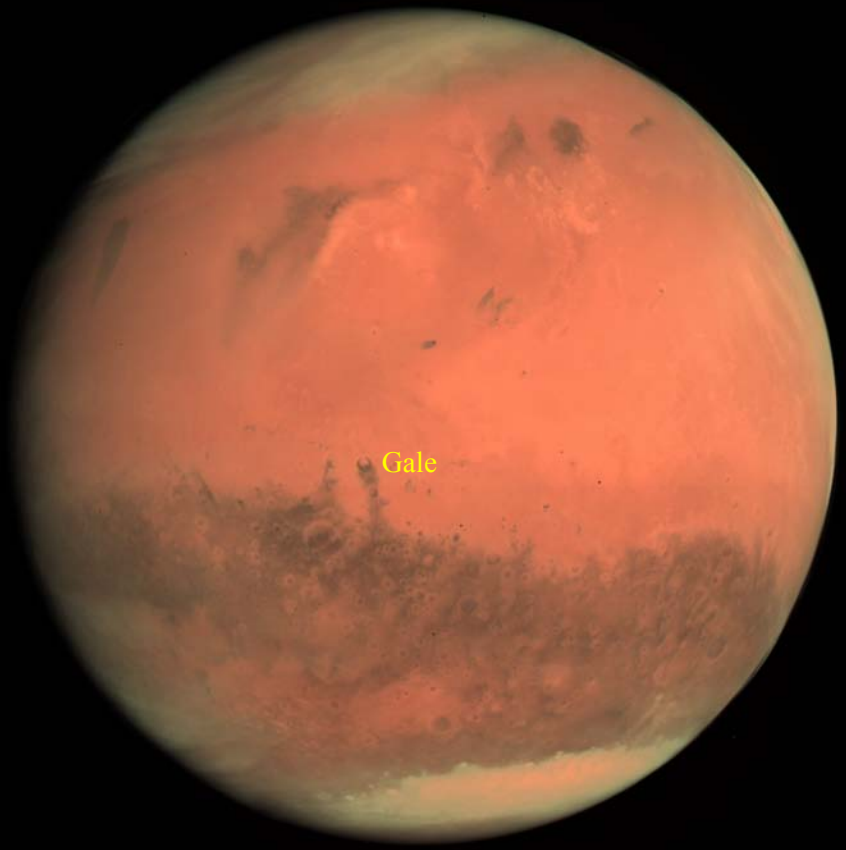
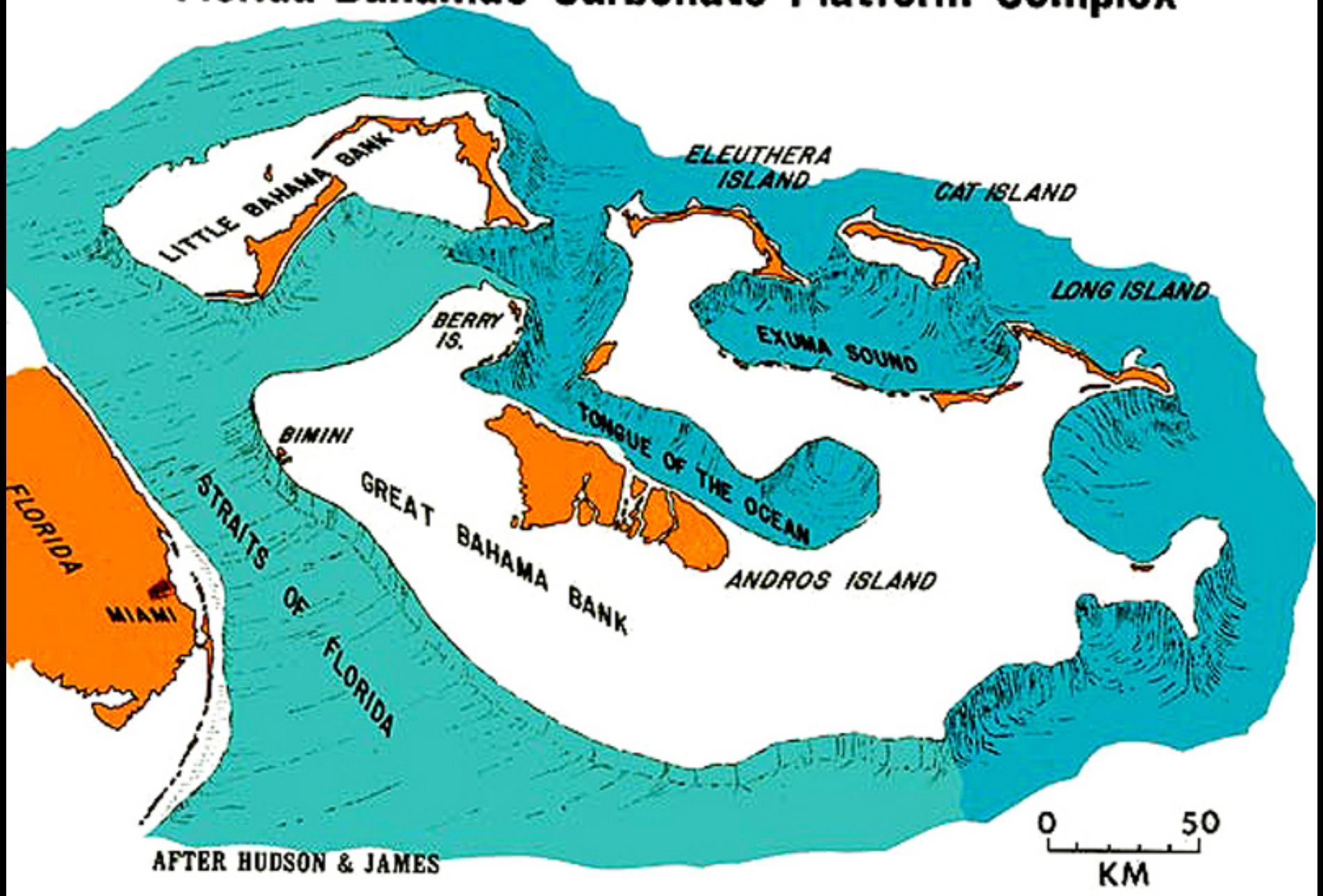
An aqueous origin for the entire Gale mound

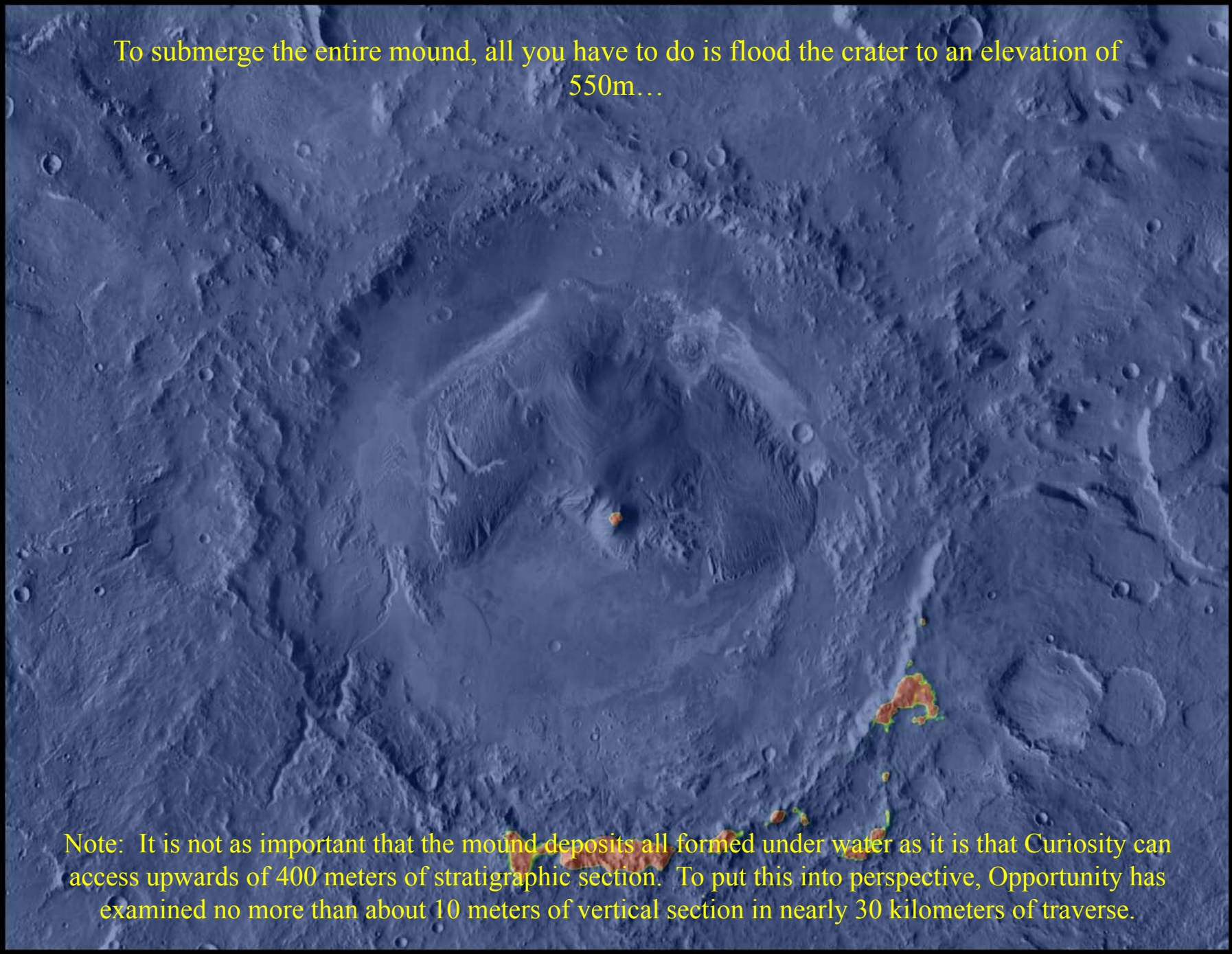
Tim Parker, JPL



Rosetta, Feb 24, 2007



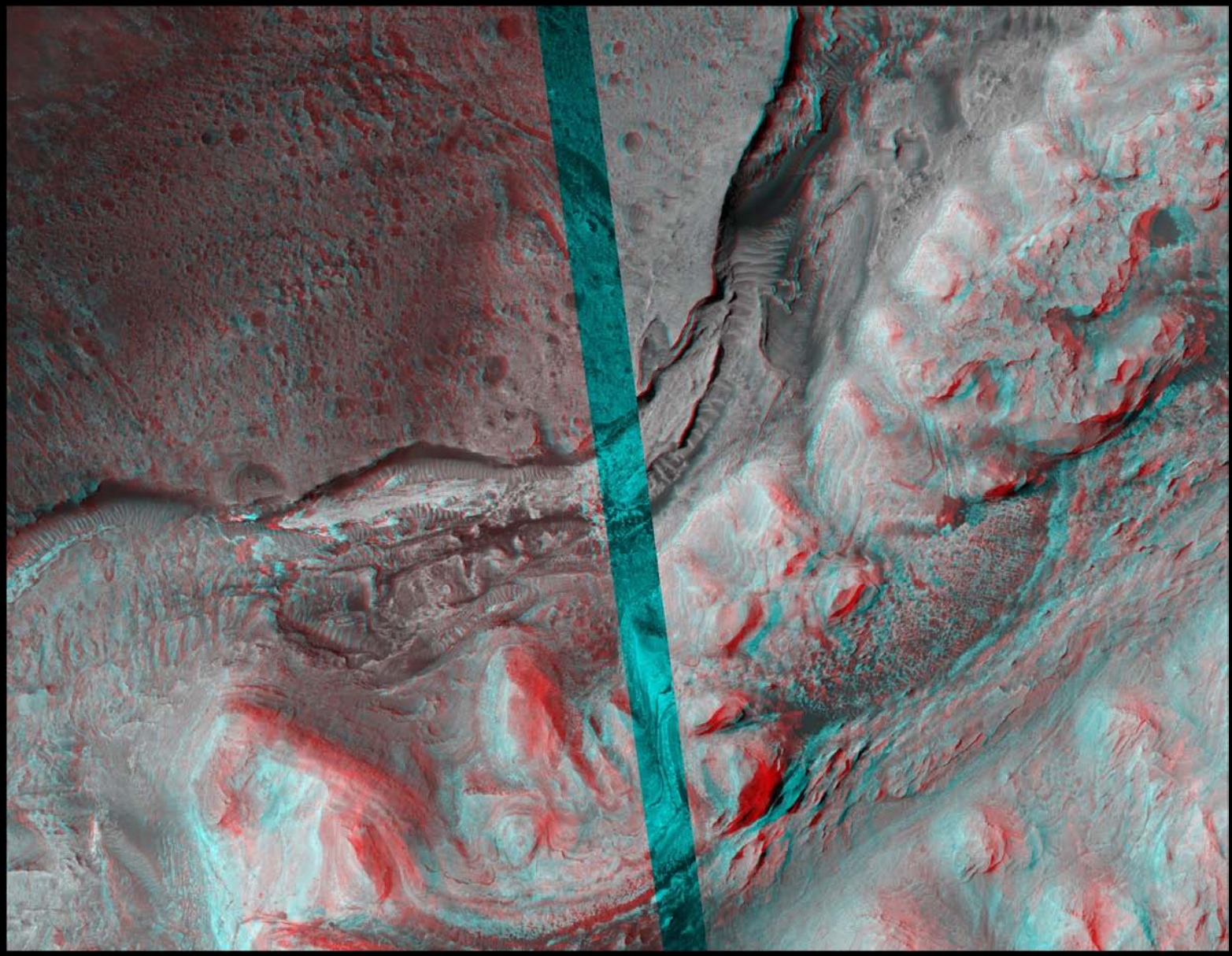
011 Bahamas Topography after Hudson and James


To submerge the entire mound, all you have to do is flood the crater to an elevation of 550m…
Note: It is not as important that the mound deposits all formed under water as it is that Curiosity can access upwards of 400 meters of stratigraphic section. To put this into perspective, Opportunity has examined no more than about 10 meters of vertical section in nearly 30 kilometers of traverse.

Evidence that the Gale mound may not have ever been much more areally extensive than it is today:

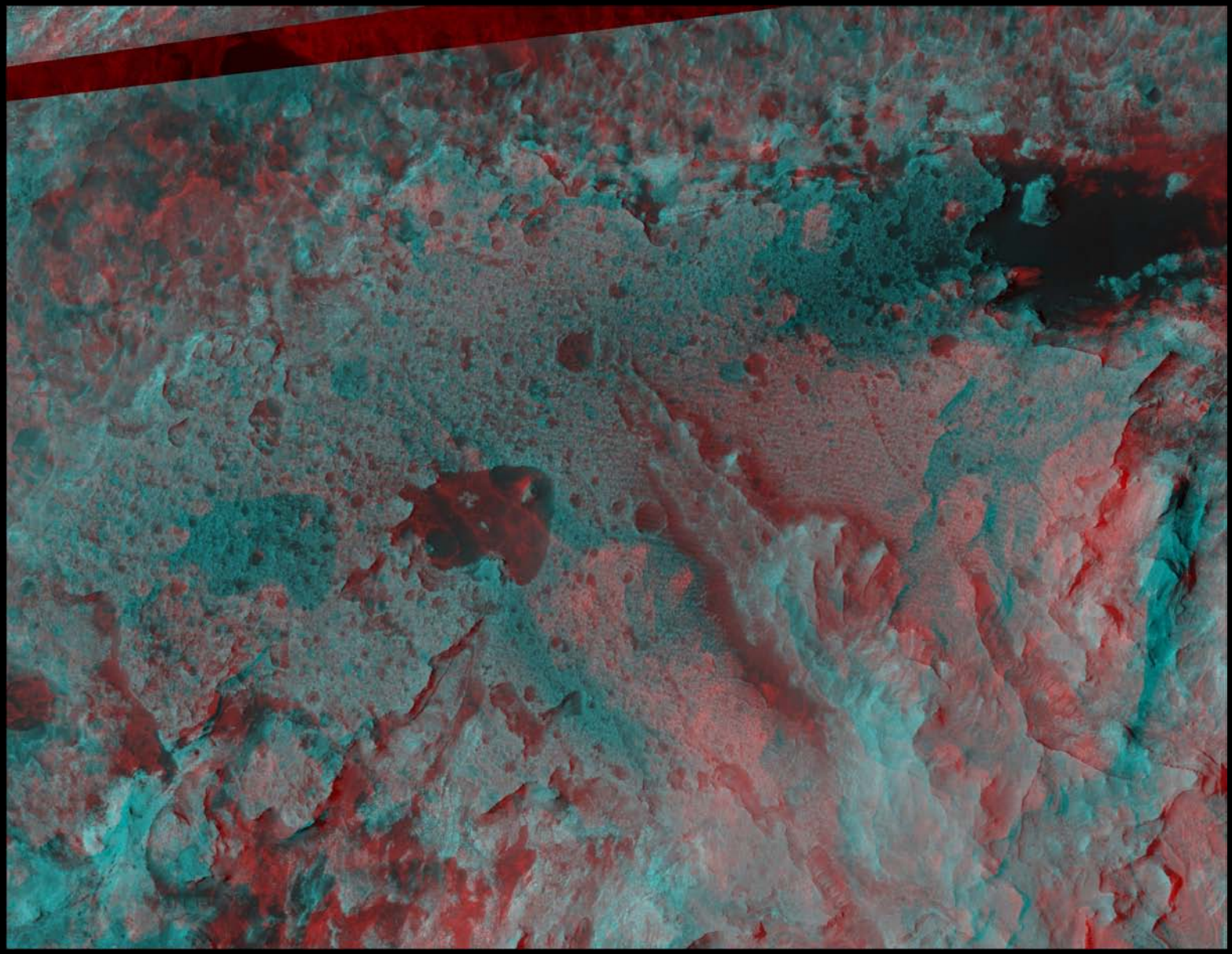
- Layering in lower mound dips gently outward from center to edges (Dawn Sumner)

- "Ring Ridge" – a topographic ridge running much of the way around the mound, shows steep dips away from mound, in places extending partway up mound slope >>



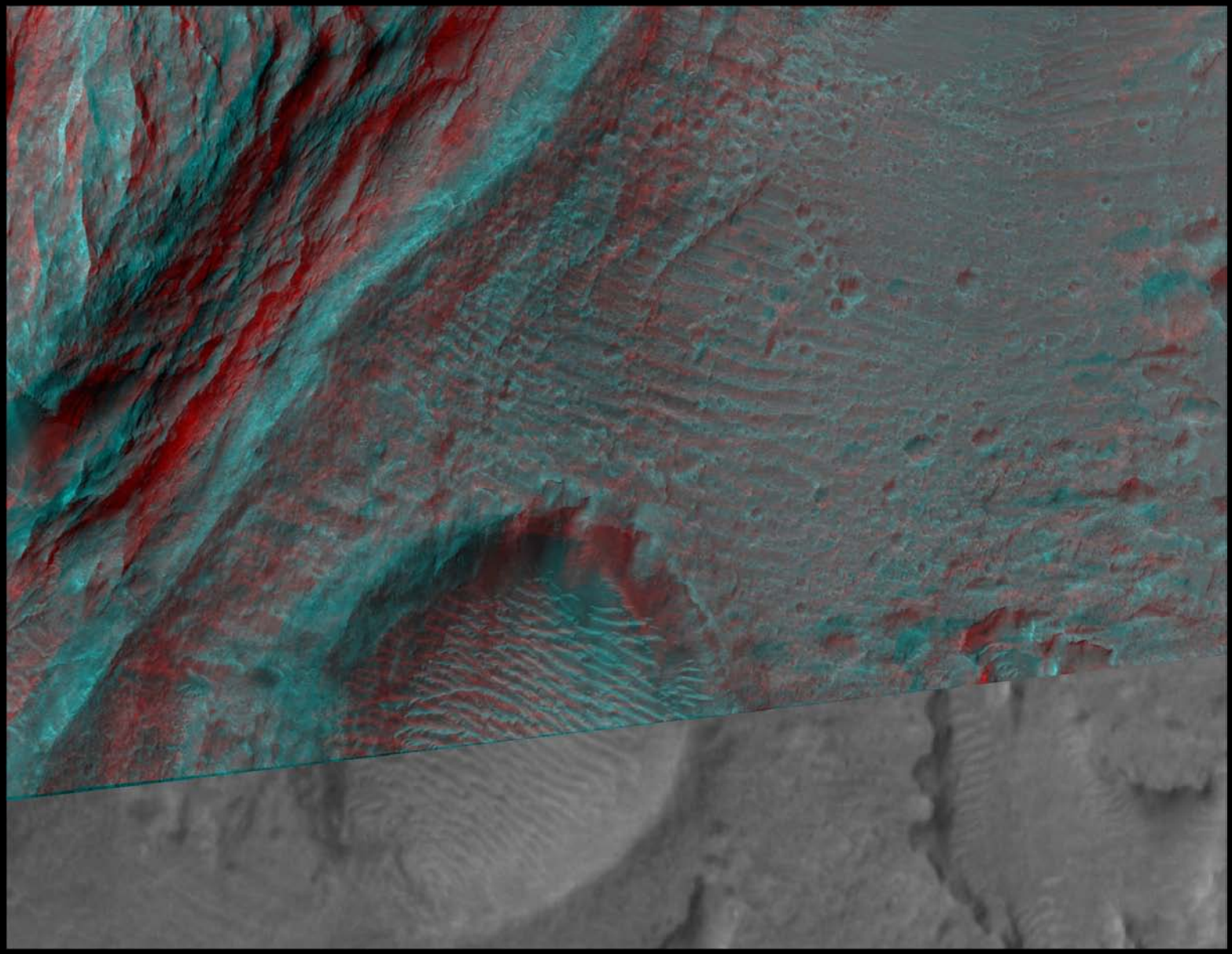
Evidence that the Gale mound may not have ever been much more areally extensive than it is today:

- "Fossil Ripples" on north slope of mound show similar orientation as ripples south of mound (as if upper mound layers "weren't there" when they formed. >>



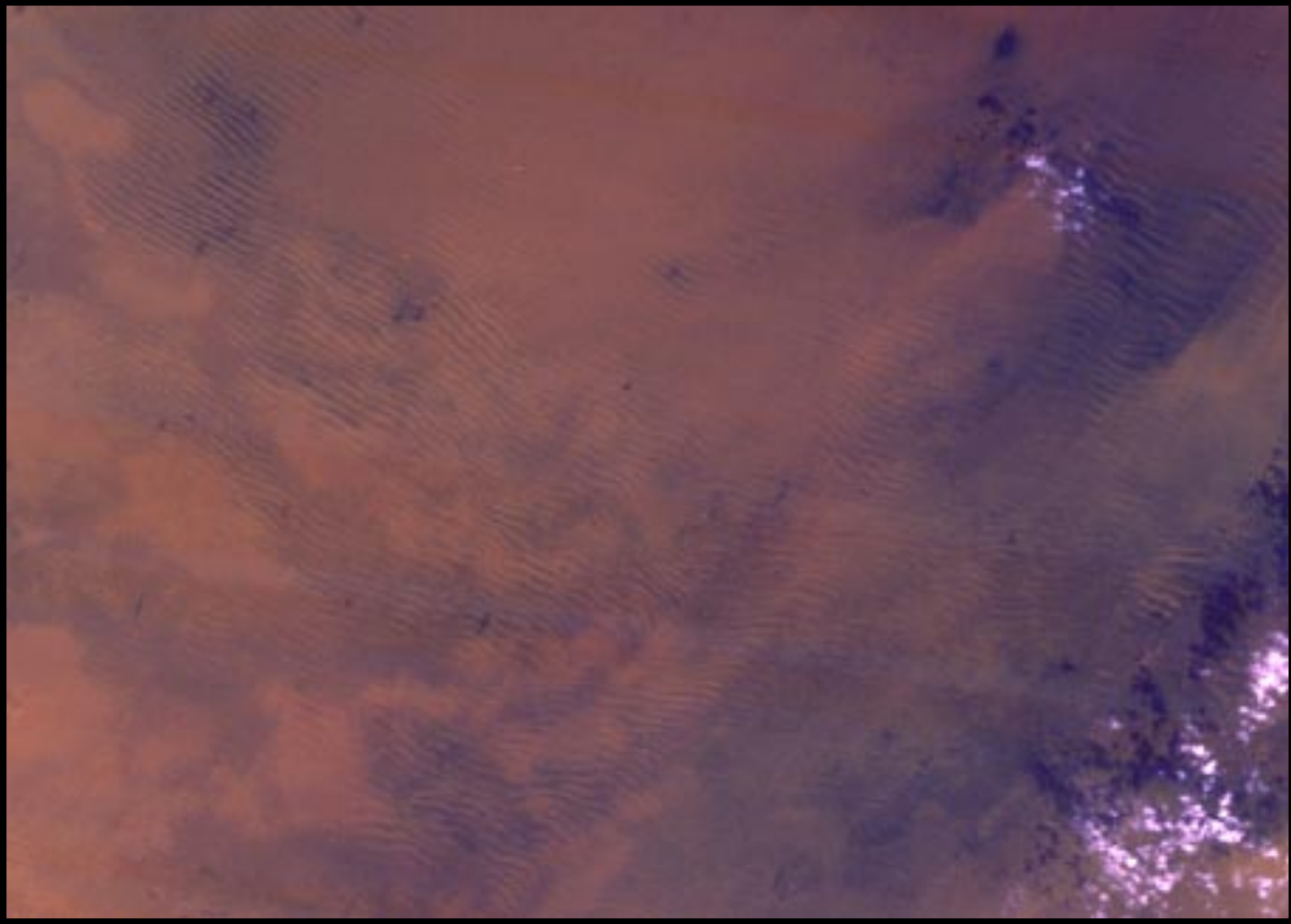
Evidence that the Gale mound may not have ever been much more areally extensive than it is today:

- "Fossil Ripples" on south slope of mound show similar orientation as ripples north of mound (as if upper mound layers "weren't there" when they formed. >>



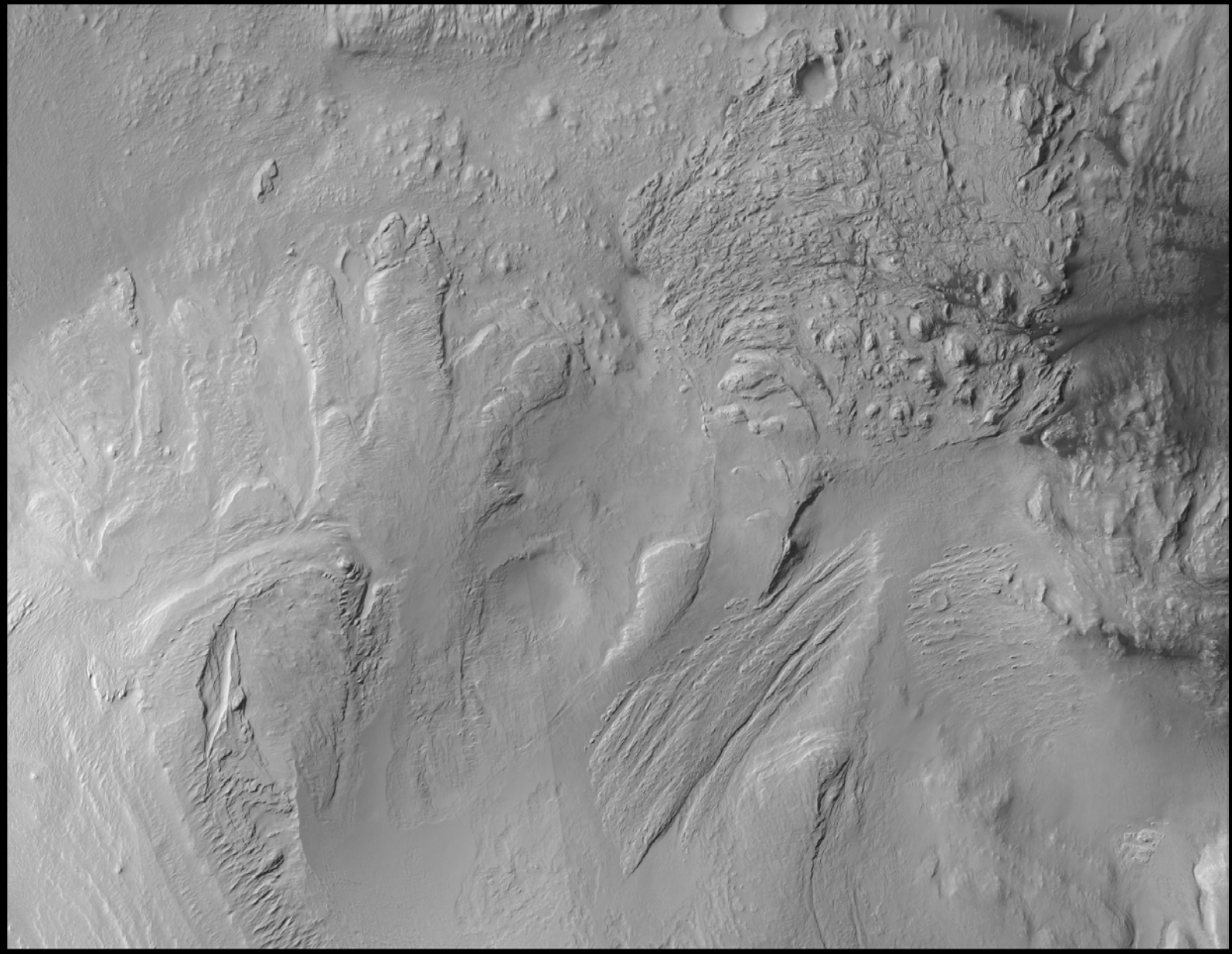
Evidence that the Gale mound may not have ever been much more areally extensive than it is today:

•Sand waves on Great Bahama Bank (stretched to look like Mars!). Wavelengths tyhpically several tens to hundreds of meters, amplitudes ~ 1 meter or so.>>



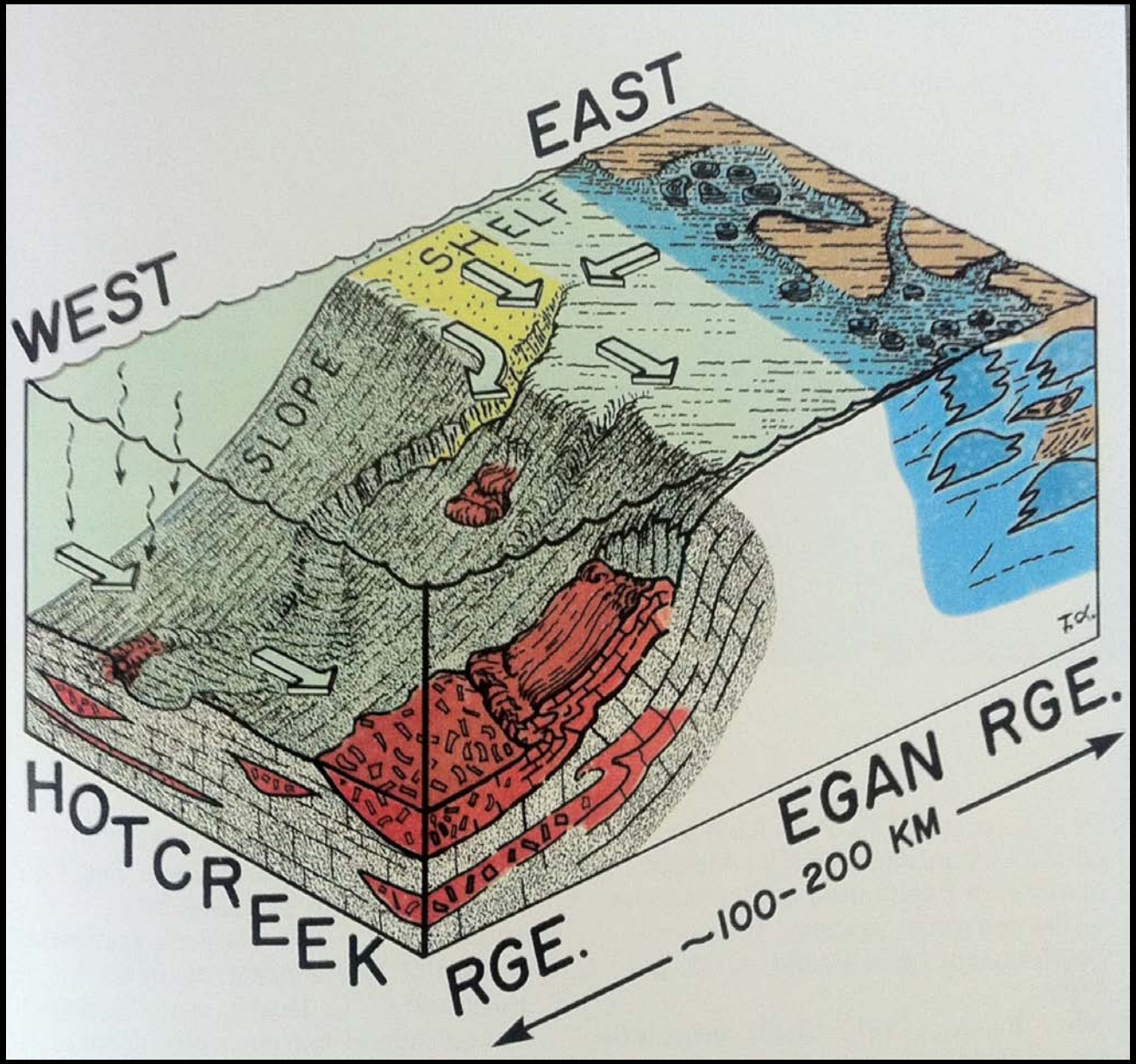
Evidence that the Gale mound may not have ever been much more areally extensive than it is today:

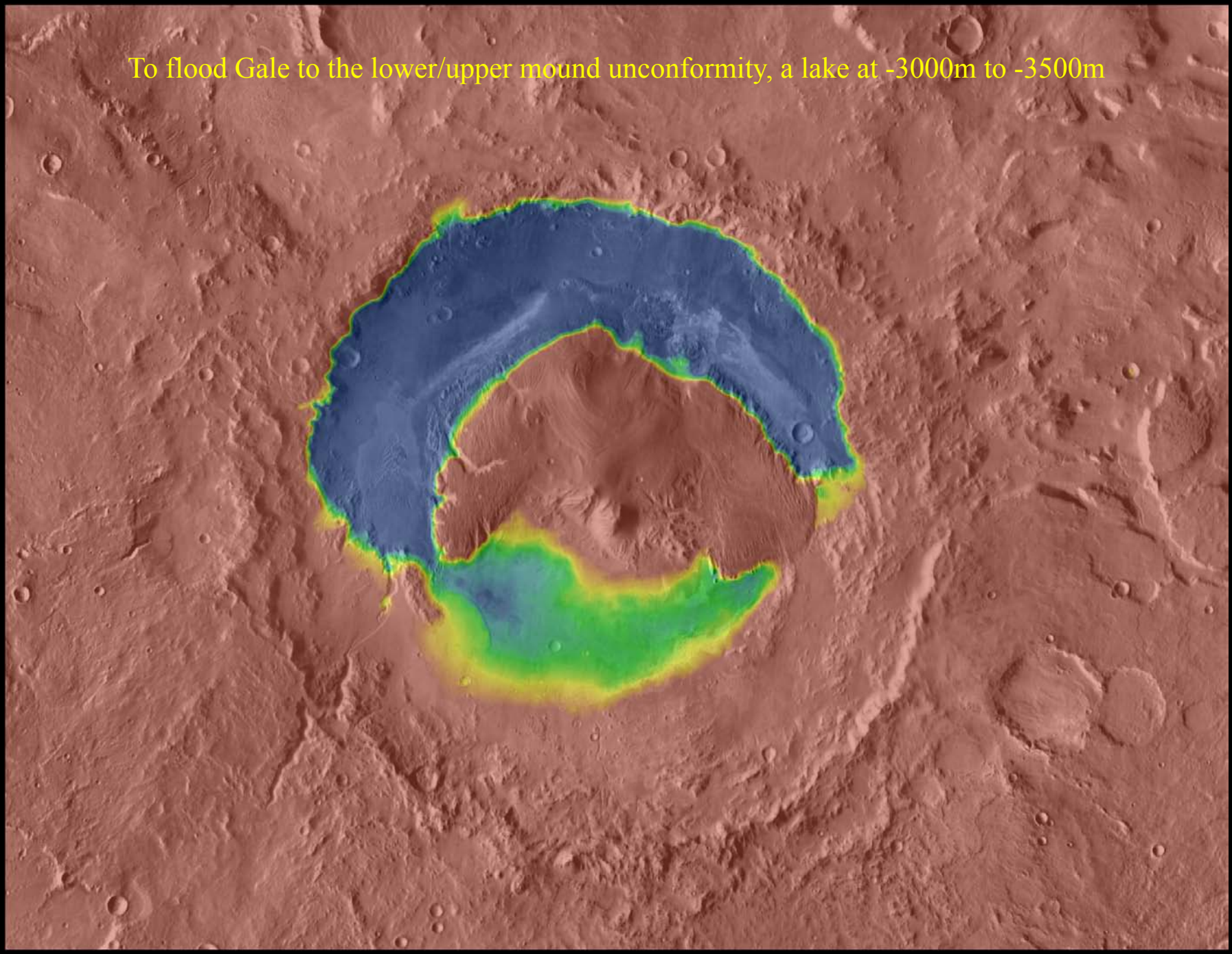
- Multiple slide lobes on north side of mound, with blocky, disorganized layering evident within blocks of larger slide at upper right.
- ALL the headscarps are buried by subsequent additional mound growth at the summit.
- Interp: Slides formed due to oversteepening of north slopes, headscarps buried as platform continued to grow.

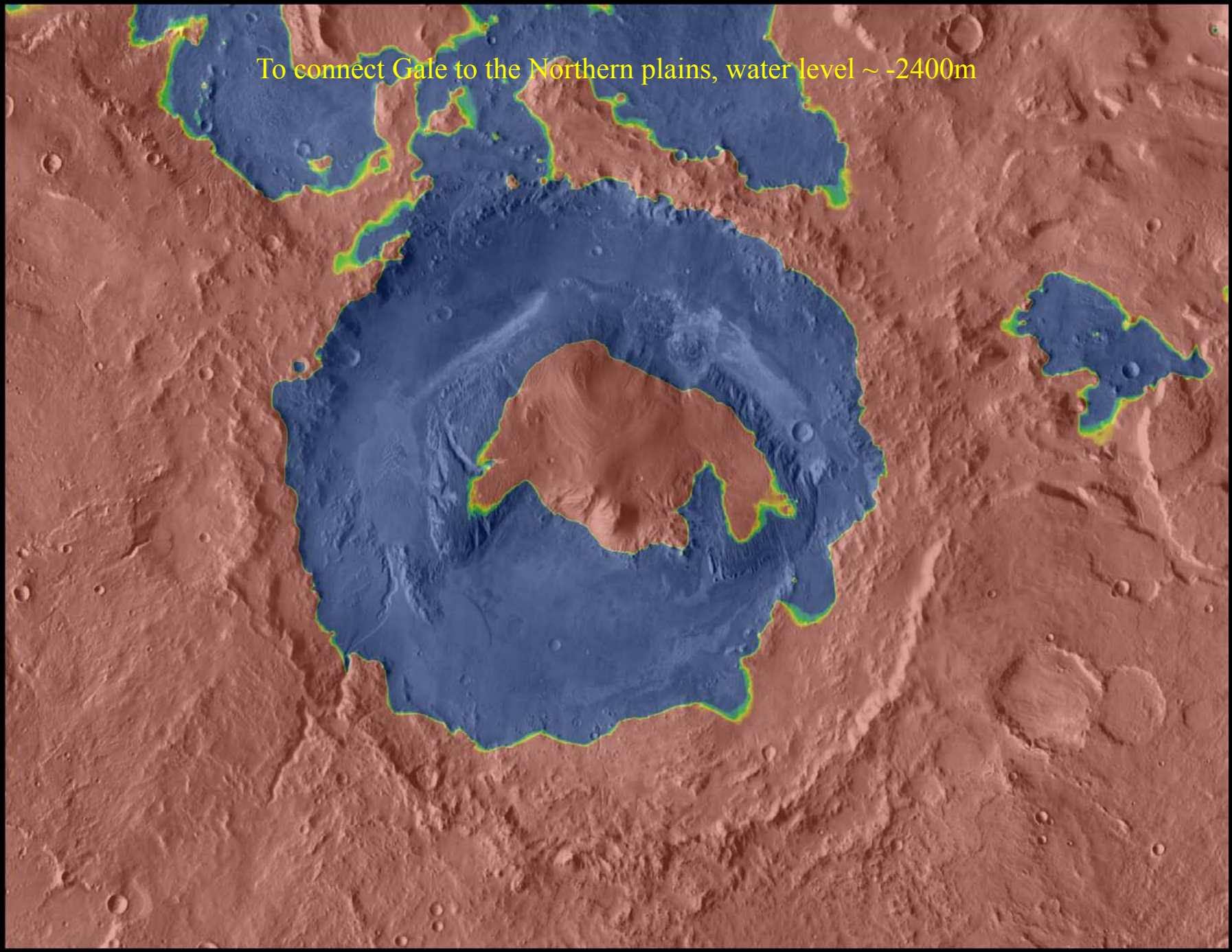


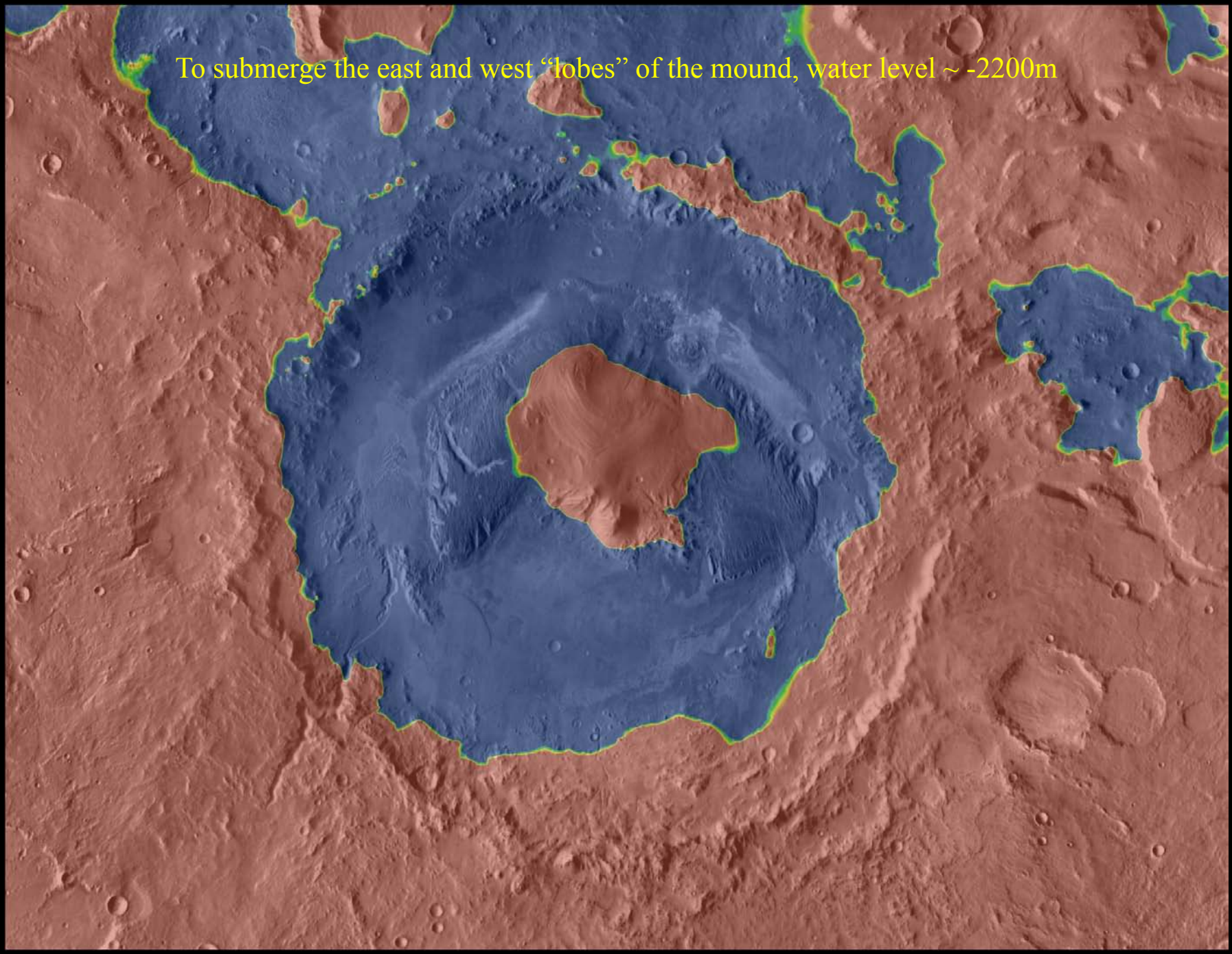
Evidence that the Gale mound may not have ever been much more areally extensive than it is today:

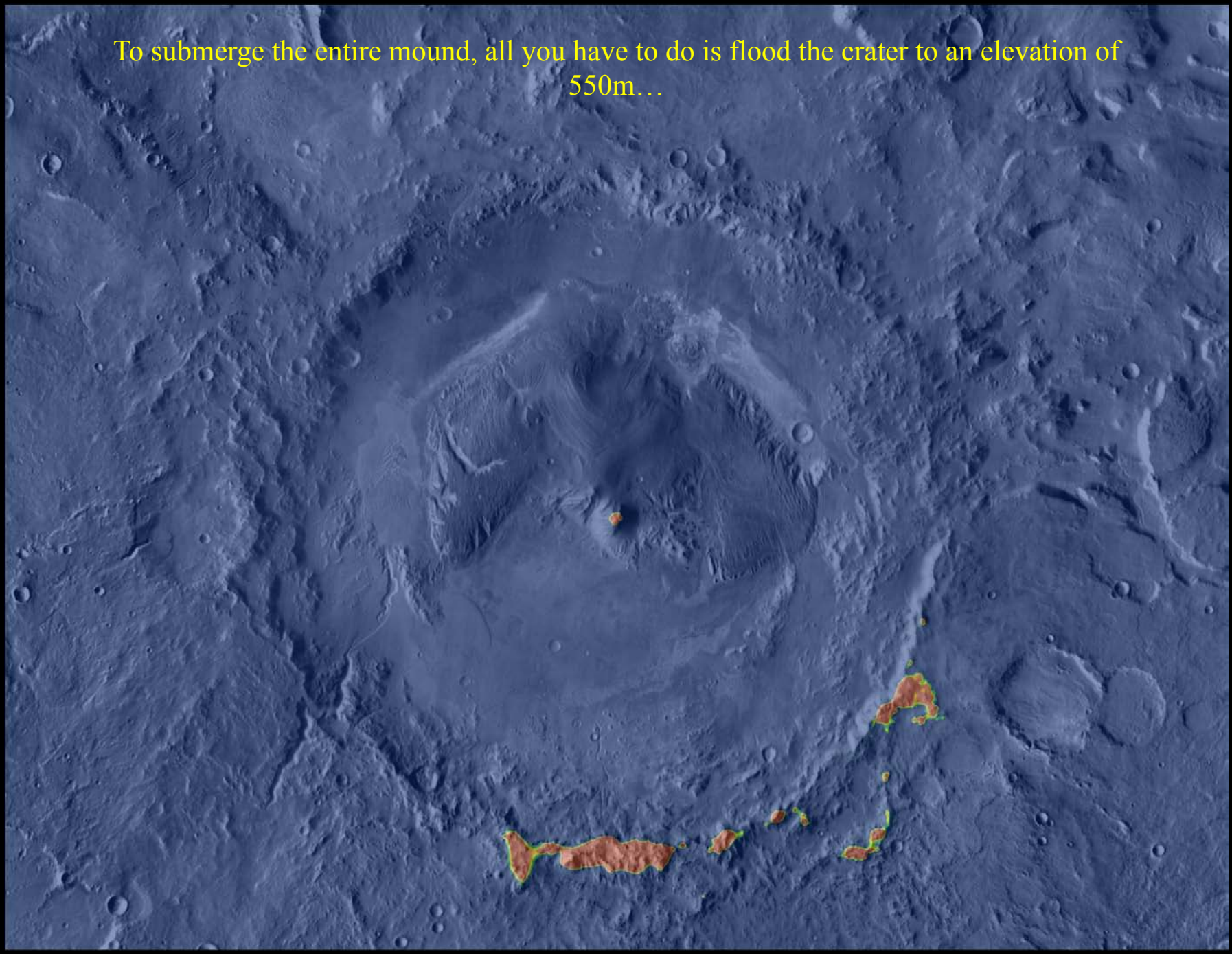
•Terrestrial analog from Cook and Taylor, 1977. >>




To flood Gale to the lower/upper mound unconformity, a lake at -3000m to -3500m


To connect Gale to the Northern plains, water level ~ -2400m


To submerge the east and west “lobes” of the mound, water level ~ -2200m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